

Appl. No. 10/795,825
Amdt. dated Mar. 1, 2005
Reply to Office action of Dec. 1, 2004

Amendments to the Specification:

On page 33 of the Specification, please replace the last paragraph (which continues to page 34) with the following paragraph:

In general, single-ended sense amplifiers are useful to save metal space, however, existing designs tend not to be robust due to their susceptibility to power supply and ground noise. In yet another aspect of the present invention, FIG. 10 illustrates a single-ended sense amplifier 1000, preferably with a sample-and-hold reference. Amplifier 1000 can be useful, for example, as a global sense amplifier, sensing input data. At the beginning of an operation, DataIn 1004 is sampled, preferably just before the measurement begins. Therefore, supply, ground, or other noise will affect the reference voltage of sense amplifier 1000 generally in the same way noise affects node to be measured, tending to increase the noise immunity of the sense amplifier 1000. Both inputs 1010, 1011 of differential amplifier 1012 are at the voltage level of DataIn 1004 when the activate signal (GWSELH) 1014 is logic LOW (i.e., at zero potential). At a preselected interval before the measurement begins, but before DataIn 1013 1004 begins to change, activate signal (GWSELH) 1014 is asserted to logic HIGH, thereby isolating the input node 1002 of the transistor M162 1008. The DataIn voltage existing just before the measurement is taken is sampled and held as a reference, thereby making the circuit substantially independent of ground or supply voltage references. Transistors M190 1025 and M187 1026 can add capacitance to the node 1021 where the reference voltage is stored. Transistor M190 1025 can also be used as a pump capacitance to compensate for the voltage decrease at the reference node 1021 when the activate signal becomes HIGH and pulls the source drain 1002 of M162 transistor 1008 to a lower voltage. Feedback 1030 from output data Data_toLSA 1035, being transmitted to a local sense amplifier (not shown), is coupled with the source/drain of transistor M187 1026, actively adjusting the reference voltage at node 1021 by capacitive coupling, thereby adjusting the amplifier gain adaptively.